MANPOWER SELECTION CRITERIA IN FLORIDA CLINICAL LABORATORIES

BY

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Dedicated to
my Grandfather
George W. Jaqua
1896-1983

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Abstract of Dissertation Presented to the Graduate Council
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This study was intended to show whether manpower selection criteria in Florida clinical laboratories were different among hospitals categorized by number of beds, location and respondent characteristics and whether certain criteria were considered more important than others in selection of personnel.

A survey questionnaire was sent to 194 administrators of short-term medical and surgical hospitals in Florida. The initial mailing and one follow-up resulted in an eighty percent return.

Analysis of data by non-parametric methods showed a relationship between selection criteria accepted or specified and the licensure or certification held by personnel responsible for hiring in the clinical laboratory. No differences were found for hospital bed size, hospital location or hospital accreditation type. Among all

respondents, the interview, applicant experience and the Bachelor of Science degree with specialization in medical technology were considered higher in importance after Florida licensure than other criteria in selection of personnel. A majority of respondents indicated use of written guidelines for selection.

Further study is needed to determine affective criteria to be used in the interview and to determine content of written guidelines to be used for selection of personnel. The importance of the interview in the selection process suggests that educators in medical laboratory education programs should provide curriculum components that would prepare students for the hiring process used by employers in clinical laboratories.

CHAPTER I
INTRODUCTION

Surveys made since 1974 of manpower selection practices in medical laboratories have focused on compensation, fringe benefits and type of certification of employees. Groups surveyed have been personnel practicing in clinical laboratory science. The instruments for these surveys were generally inserted in the pages of magazines and journals sent to certified medical laboratory personnel or mailed to persons on the periodical circulation list. Thus researchers have had no guarantee the survey reached that category of laboratory worker without national certification. Recently a professional organization for medical laboratory personnel, the American Society for Medical Technology (ASMT), has focused on the problem of quality assurance, in particular the assurance of quality personnel. Members of the organization feel that the profession has little control over hiring practices. Thus the society has advocated development of quality control measures related to personnel. Quality control measures for personnel should include credentials acceptable for initial employment. Personnel currently employed in hospital laboratories are variously qualified and range from those holding national credentials and state licensure or state licensure alone as well as those who were trained on the job and have no formal credentials. This study was designed to show whether

(a) both personnel who hold national certification and licensed individuals trained on the job are being hired and (b) whether employers are satisfied with employees of both groups, as indicated on a survey made in Florida.

Statement of the Problem

The profession of medical technology is concerned with quality patient care through assuring that precise and accurate laboratory tests are performed. The profession, with the Society as advocate, promotes quality assurance with regard to personnel performing laboratory determinations. However, the literature contains no information regarding the actual criteria used by employers to select personnel in the clinical laboratory. We assume that, in the best interest of patient care, employers are selecting well-trained personnel as defined by national certifying bodies. Strict criteria for certification have been developed in the last decade by such organizations as the American Society of Clinical Pathologists (ASCP) and the National Certifying Agency for Clinical Laboratory Personnel (NCA). However, in some states--Florida included--the profession has worked with state legislatures to develop separate licensure processes. Certification is awarded by national professional organizations through their examination and certifying agencies whereas licensure is a state prerogative. The regulations for licensure may differ considerably from certification requirements especially at higher levels such as supervisor, director, and medical technologist (MT). In some cases licensed personnel do not hold national certification or possess a degree from an accredited medical technology program or from a college or university.

The American Society for Medical Technology maintains that those involved in hiring laboratory personnel need to be educated about credentials. Assessing manpower selection criteria could provide information needed for resolving the issue of quality assurance.

Review of Literature

During the last 15 to 20 years many of the same technological changes that have occurred in medical science have occurred in clinical laboratory science. The medical technologist of the 1960s suddenly placed in the laboratories of the 1980s would recognize few of the procedures and little of the instrumentation that are now part of the practice of clinical laboratory science. However, many of the technologists of the 1960s are still practicing and most have progressed along with the technological advances. These rapid changes have caused laboratory professionals to be concerned about several issues that have an impact on those now practicing or beginning to practice in clinical laboratory science. The major issues are (a) licensure and certification, (b) manpower standards and (c) quality assurance of personnel. In addition, a new issue, (d) unification of the various professional societies in the clinical laboratory sciences, has become important in the last two years.

The literature on clinical laboratory science contains increasing research in specialty areas such as microbiology, hematology, clinical chemistry and immunochematology. The increase of research in specialty areas beginning in 1970 reflects changes in the practice of clinical laboratory science and is an indication of the expanded role of the medical technologist. Literature relating to professional issues such as those previously stated is presented in position papers or legislative reports,

but not as formal research. Research in professional issues is generally in survey form, and data collected have been used to support recommendations made in the various position papers published by ASMT. The content of these position papers has generated the research questions for this study. Personnel selection as such does not appear in the clinical laboratory science literature but does appear in the literature of other fields such as management.

Current Issues in Clinical Laboratory Science

Licensure and Certification

Licensure was originally intended to protect the public from incompetent practitioners (Department of Health, Education and Welfare, 1971). Licensing laws are a right and responsibility of the states to protect the public, and decisions are made through the state legislative process (Kelly, 1977). Licensing is designed to specify minimum requirements related to personal qualifications such as age, residence and educational background. According to the 1971 DHEW Report on Licensure and Related Health Personnel Credentialing, the main objectives are to control entrance into a particular occupation and to enforce standards of practice for the licensed professional. Among the methods that may be used to accomplish these objectives are (a) administration of examinations, (b) establishment of regulations concerning standards of practice and (c) examination of credentials (DHEW, 1971). The goal of licensure to assure competent practice is supported by ASCP and ASMT, professional organizations representing clinical laboratory personnel. The position of the ASCP is that licensure is a state prerogative which should not be influenced by the federal government (ASCP, 1978). The position of ASMT,

adopted by the 1977 House of Delegates, is that licensure provides the only legal mechanism to bar incompetent health professionals from providing services to the public (ASMT, 1977).

The goals of licensure and its support from clinical laboratory professional organizations imply a positive effect of licensure on health care delivery. The literature does not support this assumption since licensure is seen to be detrimental in several ways. Licensure limits the numbers of professionals entering practice. It also limits mobility because of lack of reciprocity among the states (DHEW, 1971; Weissman, 1979). In addition, current licensure laws are often so rigid that they deter personnel from assuming increased responsibility as technological advances occur (Roemer, 1974). As a result of these problems the 1971 DHEW Report recommended a two-year moratorium on enactment of new licensure legislation. The moratorium was extended through 1975 on the basis of a follow-up study by the Public Health Service (Weissman, 1979). In this period a study on the effect of licensure on clinical laboratory personnel (White, 1978) showed that older, more stringent licensure laws increased wages but newer licensing laws showed no effect on raising wages. White could find no evidence that licensure increased quality. This study generates a concern that licensure could increase costs but leave quality unchanged.

Certification is a voluntary process which gives recognition to a person who has met certain predetermined qualifications set by a non-governmental agency. Credentialing, in its broadest sense, includes both licensure and certification. In clinical laboratory science, certification as a credentialing process has existed since the 1930s.

Licensure is a much later method of credentialing. Currently, three major bodies grant certification to clinical laboratory personnel: (a) the American Society of Clinical Pathologists (ASCP), whose Board of Registry administers the certifying process, (b) the National Certifying Agency for Clinical Laboratory Personnel (NCA), a certifying board supported by ASMT, and (c) the American Medical Technologists (AMT), a professional organization/registry that certifies medical laboratory personnel. Each of these certifying agencies offers competency examinations which an applicant must pass before being certified by the agency. Requirements for application to take the examinations include education and experience (AMT, 1982; ASCP, 1980; NCA, 1980). Certification is offered for a variety of levels and specialities within clinical laboratory medicine. Each of the three agencies is independent of the others and does not accept credentials of the others as a waiver of examination.

Credentialing is a concern in other allied health professions as well as clinical laboratory medicine. Increasing numbers of health professionals seek recognition through certification. Credentialing standards have become an issue for the 1980s but many authors, including Friedman (1981), feel that the National Commission for Health Certifying Agencies (NCHCA), chartered in 1977, can help to achieve cooperation among the various certifying agencies. The NCHCA was chartered as a voluntary body to develop standards for certifying bodies and to encourage coordination among competing groups (Friedman, 1981). Since credentialing procedures are in the public interest the credibility of the credentials must be restored if they are to be viewed as measures of competence (Davis, 1978).

The proliferation of credentialing agencies and the lack of reciprocity of licensure laws have generated confusion in clinical laboratory science with regard to manpower standards. Involvement of the federal government in recent years shows the need for some kind of coherent national policy on clinical laboratory manpower standards to assure quality in personnel performing laboratory tests. Enactment of Medicare in 1965 and the Clinical Laboratories Improvement Act of 1967 (CLIA-67) provided personnel standards for laboratories engaged in interstate commerce. Dantzler (1977), in an article regarding licensure in South Carolina, pointed out that in this case federal authority was fragmented among several agencies and coordination of regulatory processes was not accomplished. Since that time, manpower standards have become an important and unresolved issue in clinical laboratory science.

Manpower Standards

Following CLIA-67, personnel standards were the victims of duplication and were not standardized throughout the field. In 1976, the Department of Health and Human Services (DHHS) (formerly Department of Health, Education and Welfare, DHEW) published proposed personnel standards in the Federal Register. No final action was taken on these proposed regulations up to 1978 because of the possibility of enactment of a new Clinical Laboratories Improvement Act in 1978 (Weissman, 1978). CLIA-78 was not enacted and in 1979 an interagency agreement between DHHS, the Public Health Service (PHS) and the Health Care Financing Administration (HCFA) defined responsibility of the PHS in developing scientific and technical standards (including personnel standards) for clinical laboratories. In April, 1979, HHS delegated

responsibility to the Centers for Disease Control (CDC) to develop a draft of a Notice of Proposed Rulemaking (NRPM). This NRPM was published in the Federal Register on October 12, 1979 (Rice, 1980).

HHS invited comments on the proposed standards for clinical laboratories. Speaking for clinical laboratory personnel, ASMT representatives commented that the proposed regulations relied too heavily on quality control and proficiency testing and did not provide reasonable personnel standards (ASMT, 1980). ASMT cited a paper by LaMotte presented in 1976 which reported that the "best" laboratories (based on lack of CDC deficiencies) had a high percentage of qualified technologists on staff. Findings from other studies suggest that proficiency testing is no substitute for well-trained personnel (ASMT, 1980). Taking into consideration these studies and an ASMT-sponsored management survey designed to determine the role of medical technologists in management and supervision, ASMT submitted an alternative proposal for the NRPM of October 12, 1979 (Price, 1980).

Competence of personnel performing laboratory tests is the goal of the proposed regulations. The CDC proposal and the alternate proposal of ASMT differ in the qualifications of personnel at the director, supervisor and technologist levels. Two points of view on the issue of quality personnel were presented in the December 1981 issue of the American Journal of Medical Technology. In the first article, LaMotte of the CDC Laboratory Improvement Program Office asserted that laboratory directors and supervisors are in the best position to determine personnel competence. He also stated that well-developed competency statements should be available as a basis for the expectations of the laboratory

director (LaMotte, 1981). In the second article Price wrote that competence is complex and difficult for a supervisor to assess. Competence should be assessed by a formal process that takes into account cognitive, affective and psychomotor skills of the individual (Price, 1981). According to the Federal Register, these proposed regulations were withdrawn as a result of the large number of negative comments until more objective data could be gathered about need or cost effectiveness (ASCP, 1981).

Unification

Fragmentation of representation for clinical laboratory professionals among several groups has long been a concern. This fragmentation is reflected in the variety of credentials offered to clinical laboratory practitioners. During the last few years the profession has made an effort toward unification of organizations representing clinical laboratory practitioners in order to provide a single representative voice. A Coordinating Committee for Clinical Laboratory Technology (CCCLT) was formed with ASMT, AMT and the International Society for Clinical Laboratory Technology (ISCLT) as members to discuss unity of the three organizations. Difficulties arose when this group tried to reach consensus on certain issues, with the result that ISCLT dropped out of the discussions. In the early 1980s AMT and ASMT continued to discuss unity issues (Weissman, 1982).

A "Unification Task Force" composed of representatives from AMT and ASMT was formed in 1982 to coordinate the unification process on behalf of the boards of directors of the two organizations. Two future goals at the time were to begin a joint newsletter and to provide a new journal serving AMT and ASMT (Grimes, 1982). The newsletter,

Current Topics, began publication in January 1983. Unity of the two organizations is proceeding according to the task force timetable. The 1983 ASMT House of Delegates voted at the annual meeting in June (a) to continue unification activities and (b) to accept the report of the Unification Task Forces and begin drafting by-laws for the unified organization (ASMT, 1983).

Research in Professional Issues

Literature related to professional issues concerning clinical laboratory scientists is generally based on surveys. The most comprehensive survey related to this study was a Personnel Practices Survey sponsored by ASMT in 1976. During the last five years, researchers considering manpower have focused on job satisfaction, promotion potential, management functions, compensation, and student performance on the job. Specific research regarding manpower selection criteria does not appear in the medical technology literature.

The 1975 National Personnel Practices Survey was designed to provide a profile of the medical technology profession. The questionnaire was distributed to approximately 63,000 individuals through an insert in Cadence magazine. The total response was 4,078, or less than 7% of those surveyed. Some 83% of the respondents indicated they were certified by ASCP, 6% by AMT and 11% by other agencies. Other data collected referred to fringe benefits, educational level and job category. Related to this study were the findings that written job descriptions were given to only about half of the respondents employed in non-governmental hospitals. Written job descriptions generally include specifications for the qualifications of the individual (Roach, 1975a; Roach, 1975b). In May, 1976, the Laboratory

Management Consultation Office, Centers for Disease Control, conducted a survey of clinical and public health laboratories to update data from the previous surveys done in 1971 and 1975 in cooperation with ASMT. Investigators sent survey questionnaires to a selected sample of laboratories and obtained a national response rate of 83%. In this study approximately 65% of the technical personnel in clinical laboratories were reported to have at least one certification or registration (Lawton, Dugan & Rossing, 1977).

In 1979, ASMT updated a previous compensation survey done in 1977. Whereas the 1977 survey was intended to gather information at the regional level, the 1979 National Compensation Survey was designed to provide information at the state level. Final survey returns were received from 4,854 respondents from a total of 8,000 randomly selected ASMT members. Significant findings were that compensation had not kept pace with inflation, salaries varied with job position and large hospitals paid more than small hospitals (ASMT E&R Division, 1980). Also in 1979, ASMT sponsored a management survey designed to gather data about administrative functions of medical technologists. The respondents totaled approximately 1,300 ASMT members holding the position of administrative or chief technologist. The survey results showed that more than half of the respondents performed all of the managerial functions in the laboratory. The results of this survey were used to develop the recommendations of ASMT for alternate personnel standards in response to CDC's Notice of Proposed Rulemaking of October, 1979 (Price, 1980). Although these surveys provided many results of interest to the profession, they cannot be construed as a true picture of laboratory medicine. The sample selected for each

survey was the membership of ASMT and this does not represent the total laboratory worker population.

Two recent studies investigated opportunities and attitudes toward professional growth (King & Robinson, 1980; Russell, 1981). King and Robinson, investigating staff development practices in New York State, showed that medical technologists do not have the opportunity to participate in continuing education. Russell, in a 1981 dissertation, found in a survey of Massachusetts laboratory personnel that medical technologists have a favorable attitude toward continuing education. Although attitudes are positive, opportunity within the work environment may be lacking.

Much attention has been given recently to mobility of laboratory personnel as reflected in job satisfaction, promotion potential and job turnover. In three recent studies investigators explored these important areas (Broski, Manuselis & Noga, 1982; Day & McClure, 1980; Karni, Studer & Carter, 1982). In a study of job turnover in the Minneapolis-St. Paul area, Karni, Studer & Carter (1982) found that although the turnover rate showed a slight decrease, avoidable resignations showed an increase during the period of the study (1970-1980). Avoidable resignations included those due to unpleasant working conditions, lack of job satisfaction and moving to a new work experience. Broski et al. (1982), studying four allied health groups (including medical technologists), found that medical technologists were less satisfied than medical dietitians, occupational therapists and physical therapists. Comments on sources of dissatisfaction from the medical technologists included limited upward mobility, limited authority and high stress. Day and McClure (1980) studied promotion potential

in medical technology. They found that most technologists believed they were promoted for reasons other than managerial potential and that goal-setting behaviors were more likely to lead to promotion. In addition the respondents expressed a need for management education for medical technologists. These studies generate a concern about the atmosphere of the work environment. Personnel resigning for avoidable reasons may be a reflection of the initial selection process.

Research Related to Personnel Selection

The literature of personnel management contains much information regarding personnel selection. The information is general but may be applied to personnel selection in clinical laboratories. One common theme in several papers in personnel journals is the need for a systematic approach. Malinowski (1981) advocated task analysis in developing selection criteria. Acuff (1981) expressed a need to develop specific criteria that can predict an applicant's chance for success in the position.

Petit and Mullins (1981) listed steps needed for good decisions on employee selection. First, define expected performance; second, identify key factors such as skills and motivation; third, collect information about key factors from candidates; and fourth, evaluate candidates, using an objective rating scale. The use of references as a criterion is advocated by some authors but not by others. Witkin (1980) said past performance is the most important indicator of success. Muchinsky (1979), in a paper on validity and reliability of references, stated that evidence suggests that references are not valuable as selection devices.

In conclusion, the literature leaves several questions unanswered with regard to criteria for selecting personnel for laboratories. First, no information is available about specific criteria used for selection. Second, fragmentation of professional credentialing does not provide a systematic approach when investigators attempt to identify a key factor such as certification. Last, researchers have reported job dissatisfaction among medical technologists but have not investigated whether the dissatisfaction is directly related to the selection process.

Assumptions

In developing research questions and hypotheses regarding manpower selection criteria, this investigator made several assumptions:

1. Many laboratory supervisors are not familiar with the variety of credentials available for laboratory personnel. Therefore these employers will tend to select credentials similar to their own.
2. The type of laboratory found in larger hospitals differs from that of smaller hospitals. Larger hospitals tend to be more departmentalized than smaller hospitals. The latter may have only one or two generalist technologists on staff. The same type of differences will be apparent in hospitals serving rural as opposed to urban populations. Therefore one assumes that the selection criteria for small versus large and rural versus urban hospitals will be different.
3. Laboratories that are approved by the College of American Pathologists (CAP) would tend to have a better awareness of American Society of Clinical Pathologist (ASCP) credentials since these two organizations cooperate with each other. Therefore the writer assumes that laboratories approved by the CAP tend to select personnel with ASCP credentials.

4. The investigator assumes that most employers use informal guidelines as criteria and that these employers will prefer a national credential over a state credential.
5. The types of degrees and education required by the various credentialing nd licensing bodies vary. Therefore the writer assumes that employers will select employees more on the basis of a national credential than on the type of degree or the amount of education of the applicant.

Research Questions

Based on the above assumptions, this study was designed to answer the following questions:

1. Do employers select applicants with credentials similar to their own?
2. Do standards for selection for large hospitals (more than 200 beds) differ from those for small hospitals (fewer than 200 beds)?
3. Do standards for selection for rural and urban hospitals differ?
4. Do laboratories with CAP approval tend to select personnel with ASCP credentials?
5. Do employers express a preference for a national credential over a state credential?
6. Do most employers use informal or unwritten criteria rather than written criteria for selection?
7. Do employers place more value on a national credential than on the amount of education of the applicant?

Hypotheses

Seven hypotheses to be tested were developed from the previous research questions. The null hypotheses are as follows:

1. Employers do not select employees according to their own credentials.
2. Selection standards for large hospitals do not differ from those of small hospitals.
3. Selection standards for rural hospitals do not differ from those of urban hospitals.
4. Employers in laboratories with CAP approval do not prefer personnel with ASCP credentials over personnel without ASCP credentials.
5. Employers make no distinction between state and national credentials in selecting employees.
6. Employers do not use informal criteria as often as written guidelines for employee selection.
7. Employers do not consider national credentials as important as a college degree in selecting employees.

Limitations of the Study

This study was limited in two ways: the scope of the study itself, and the limitations inherent in any data collection using the questionnaire method.

The scope of the study limits to some extent generalization of results. The data were collected in a licensure state (Florida) and thus results cannot be used to predict, in a general sense, criteria for employment in non-licensure states. Given the professional concern with enlightenment of employers about credentials, the results in this study may predict tendencies in other states. This will be true in cases where employers tend to select credentials similar to their own. Florida is unique in another respect: the licensure law is broad and

allows for several alternate educational routes for licensure at the technologist level. The national credentialing agencies (ASCP and NCA) require a bachelor's degree including formal education in accredited laboratory education programs or the bachelor's degree plus experience for certification at the technologist level. Licensure is also required for employment in non-federal hospital clinical laboratories in Florida and for this reason will be given a high priority as a criterion. Criteria rated second or third will be an indication of employer preferences in the certification and education categories.

This researcher does not believe that the limitation of generalizability negates the results of this study. The intent of the study was to generate data. Information thus gained will suggest more questions than it will answer. No specific data have been collected regarding employment criteria in clinical laboratories that can answer the concern of the profession regarding quality personnel. The findings of this study should serve as a basis for further research in the area and should stimulate discussion within the profession about quality assurance. This research should also provide information for those drafting the regulations for new licensure laws.

The second limitation, that of the data-gathering instrument, has been controlled by the methods and design of the study. Allen (1975) summarized the results of research on questionnaire design and made the following points regarding effective questionnaires:

1. A one-page format encourages response.
2. Respondents should be given motivation to respond by a strong cover letter and the offer of a summary of data.
3. A response rate of 30% to 40% is average for a mailed questionnaire.

The instrument used in this study was pretested for clarity and data analysis. It was a one-page format with closed-response questions. Respondents were offered a summary of data. The response rate was 80.1%. Additional aspects of the design and control methods are discussed in Chapter II.

Acronyms

AABB	American Association of Blood Banks
AHA	American Hospital Association
AMT	American Medical Technologists
ASCP	American Society of Clinical Pathologists
ASMT	American Society for Medical Technology
BS	Bachelor of Science
BSBS	Bachelor of Science in biological science
BSCh	Bachelor of Science in chemistry
BSLA	Bachelor's degree in liberal arts
BSMT	Bachelor of Science in Medical technology
CAP	College of American Pathologists
CDC	Centers for Disease Control
DHEW	Department of Health, Education and Welfare
DHHS	Department of Health and Human Services
HRS	Department of Health and Rehabilitative Services
ISCLT	International Society for Clinical Laboratory Technology
JCAH	Joint Commission on Accreditation of Hospitals
MLT	Medical laboratory technician
MT	Medical technologist
NCA	National Certifying Agency for Clinical Laboratory Personnel

OJT	On-the-job trainee
SPSS	Statistical Package for the Social Sciences

Definition of Terms

Medical technologist. Category of laboratory personnel with a bachelor's degree from an accredited medical laboratory program or completion of a structured laboratory program plus a bachelor's degree.

Medical laboratory technician. Category of laboratory personnel with two years of college plus a structured laboratory training program or an associate degree from an accredited medical laboratory program.

On-the-job trainee. A person who has worked in a clinical laboratory under supervision, learning procedures while employed.

Chief technologist. The person in the clinical laboratory responsible for management functions of the laboratory including hiring of personnel. Often called the administrative technologist or lab manager.

Section standards. Credentials, including education, licensure and certification required for employment in a particular laboratory.

Joint Commission on Accreditation of Hospitals. An accrediting agency for hospitals including the clinical laboratory.

College of American Pathologists. Accrediting agency for pathologists and clinical laboratories. It has close ties to the ASCP.

American Association of Blood Banks. Certifies independent and hospital laboratory blood banks.

Phlebotomist. A person trained in venipuncture whose function is to draw blood samples for laboratory analysis.

Support personnel. Personnel in laboratories such as clerks, secretaries and glassware washers, who perform tasks supportive to laboratory analysis.

Organization of the Report

This report consists of four chapters, each covering a specific aspect of the study. Chapter I has been an introduction, including background of the study, review of the literature, research problems, assumptions of the study, limitations of the study, hypotheses and definition of terms.

Chapter II covers the procedures used in data collection and analysis and includes a description of the population surveyed and the instrument used. It includes data analysis rationale and methods. Chapter III contains a description of the results of the study in both tabular and narrative form. Chapter IV is a summary of the report and includes suggestions for further research generated by the study results.

CHAPTER II
DATA COLLECTION AND ANALYSIS

Data Collection Methods

The research approach for this study was the survey. The researcher developed a questionnaire to gather data on criteria used by administrative personnel to select entry-level technologists for clinical laboratories in Florida. The instrument (Appendix C) included items designed to provide data to test seven hypotheses and to gather demographic data, including type of accreditation, staffing, number of employees and employment potential in the state.

The format used in the one-page questionnaire was the forced- or closed-choice question. Items for demographic data (questions 3-8) were based on established clinical laboratory categories. Certification criteria used in items nine and ten were chosen on the basis of national practice using the 1975 Personnel Practices Survey (Roach, 1975a; Roach, 1975b). Educational criteria included all categories listed by national certifying bodies for clinical laboratory personnel as equivalent in educational requirements for certification at the technologist level as well as categories required for licensing at the technologist level in Florida (AMT, 1982; ASCP, 1980; Florida Department of HRS, 1977; NCA, 1980).

The questionnaire was field tested for clarity using ten Gainesville, Florida, administrative or supervisory technologists who were involved in the hiring or educating of medical technologists.

These persons were asked to complete the questionnaire then were questioned in person about the content and clarity of the items. Comments of the respondents resulted in no changes in the basic criteria or demographic items but in minor changes in the wording of instructions.

The investigator mailed questionnaires to hospital administrators listed in the American Hospital Association Guide to the Health Care Field (AHA, 1982). A cover letter (Appendix A) described the study and requested that the questionnaire be forwarded to the chief technologist, or the person responsible for hiring in the clinical laboratory. A postcard was also enclosed to return if the respondent desired a summary of the data. The packet included a stamped, addressed return envelope.

Most authors of material regarding survey research recommend avoiding the use of mailed surveys unless specific methods are used to assure a good return. This mailing was designed to facilitate a good return rate and incorporated suggestions from several sources. Methods recommended for increasing the validity and return rate of a mailed survey include the following:

1. Use a strong cover letter stating the purpose of the study, emphasizing the importance of the data to the respondent (Berdie & Anderson, 1974).
2. Give assurance of confidentiality (Bradburn & Sudman, 1980).
3. Provide internal consistency by asking the same question in different ways (Allen, 1975).
4. Provide motivation for return by offering a "reward" such as a summary of data (Allen, 1975).

5. Keep questionnaire short; a one-page format is preferred (Allen, 1975).

These suggestions were incorporated in the methods used for this survey. The package included a strong cover letter on letterhead and was prepared on a wordprocessing system. Respondents were assured confidentiality in the cover letter and on the questionnaire. The questionnaire asked only for the title of the respondent. The hospital was indicated by a code number on the questionnaire. Questions nine and ten asked for the same information, a rating by importance and rank of criteria used for selecting employees. Respondents were offered a summary of the data collected. The questionnaire format was one page; the instrument was composed of items to be checked.

The investigator sent a letter (Appendix B) approximately four weeks after the initial letter, enclosing a stamped envelope and a copy of the questionnaire. She did not send a second follow-up because of the return rate after the first.

Population and Sample Characteristics

The investigator sent questionnaires to 194 Florida hospitals selected on the basis of facility and control codes used in the AHA Guide to the Health Care Field (AHA, 1982). For this study, she chose only short-term, general medical and surgical hospitals. She omitted federally controlled hospitals because they are not required to adhere to state laws with regard to personnel licensure and thus are not typical Florida hospitals. She omitted hospital categories other than short-term medical and surgical for two reasons. First, the facility codes listed for these hospitals varied considerably and some

did not have support services that would indicate the presence of laboratory services. Second, this researcher desired to have as homogenous a sample as possible without increasing research costs beyond a reasonable limit.

The size of the hospitals surveyed ranged from 27 to 1101 beds. Sample characteristics by number of beds and percent is shown in Table 1.

TABLE 1

Size of Hospitals Surveyed

Range	Number	Percent of Sample
fewer than 100 beds	51	26
101 - 200	54	28
201 - 300	39	20
301 - 400	23	12
401 - 500	9	5
more than 500	18	9
	Total = 194	Total = 100

For the purposes of this study, hospitals with fewer than 200 beds are designated as small, those with more than 200 beds are designated as large. In the sample surveyed 54% are defined as small and 46% large.

Short term indicates an average length of stay for patients of fewer than 30 days (AHA, 1982). Control of the hospitals surveyed fell into three categories: non-federal governmental, non-governmental not-for-profit and investor owned (for profit). Table 2 contains a summary of the control characteristics of the sample.

TABLE 2

Control of Hospitals Surveyed

Category	Number of Hospitals	Percent of Sample
Non-federal governmental	56	29
Non-governmental not-for-profit	74	38
Investor owned (for profit)	64	33
	Total = 194	Total = 100

Analysis of Data

Selecting appropriate statistical tests for analysis of data from this study required one major decision. Since no previous studies had been done relating to the population studied, no information was available about distribution characteristics. Since no assumption regarding distribution could be made the decision was to use non-parametric tests of significance (Siegel, 1956).

This study included data about population characteristics such as number of beds, licensure of respondent, and staffing patterns which involved categorization. These categories can be classifed only as nominal. According to Siegel (1956), hypotheses based on assumptions dealing with nominal data may be tested on the basis of goodness of fit using statistical tests such as the chi-square test of significance. Certain portions of the data could be categorized as ordinal. For example, respondents were asked to rank their preference for certain categories of selection standards (Question 10) on the questionnaire (Appendix C). Ordinal data may be tested with a variety of statistical tests, among them the Mann-Whitney U test (Siegel, 1956). Certain of the data were related to population characteristics and were analyzed using frequency counts.

The data obtained were entered into a Decsystem 20 computer, using a keyboard. The data were analyzed using the Statistical Procedures for the Social Sciences system (SPSS) (Nie, Hull, Jenkins, Steinbrenner & Bent, 1975). Programs used included CROSSTABS, FREQUENCIES and non-parametric statistical tests (NPAR TESTS). Since many of the respondents failed to answer one or more of the questions, the investigator used the SPSS option to delete missing data from statistical computations.

CHAPTER III
DATA ANALYSIS RESULTS

The purpose of this chapter is to present the results of a survey of manpower selection criteria from a sample of 194 Florida hospital laboratories. An initial mailing of the questionnaire (Appendix C) and one follow-up resulted in 156 replies. Of these, one questionnaire was returned incomplete without comment, a second was returned in the form of a letter stating that the respondent refused to complete the questionnaire on the basis of philosophical concern. This respondent believed that credentialing groups had "bid up requirements for many positions" and that a "mix of educated, trained or oriented personnel" was sufficient to accomplish the functions of a clinical laboratory. A total of 154 completed questionnaires was used in the statistical analysis of the data. The data and analyses are presented in three sections. The first contains demographic data not related to the hypotheses. The second contains results of the analyses of the data related to the hypotheses as stated in Chapter I. The third section is a discussion of these analyses.

Section One: Demographic Data

Data regarding characteristics of the surveyed hospitals included number of beds, location of hospitals, licensure/certification of respondent, hospital/laboratory accreditation, numbers of personnel, staffing pattern, numbers of staff openings and credentials specified or accepted for employment.

Hospital Size and Location

Hospital size was obtained from the AHA Guide to the Health Care Field. Respondents were asked to indicate if their hospital served (a) a rural or (b) an urban population. These results are summarized in Table 3.

TABLE 3

Size and Location of Responding Hospitals

Size	No. Large	No. Small	No. Rural	No. Urban
All hospitals	76	78	46	108
Small hospitals	--	--	37	41
Large hospitals	--	--	9	67

n = 154

Among all hospitals, the large and the small hospitals were evenly balanced. Eighty percent of rural hospitals were small and 20% were large. Thirty-eight percent of urban hospitals were small and 62% were large. A majority (70%) of the respondents indicated their hospitals were considered urban.

Licensure/Certification of Respondent

The types of licensure and certification held by respondents included Florida license (Fla), ASCP, AMT, and NCA. All respondents held Florida licensure and various combinations of national certification. Table 4 contains a summary of the types of licensure/certification held by respondents.

TABLE 4

Licensure/Certification of Respondents

Credential	Number	Percent
Florida licensure only	41	27
Florida, ASCP	74	48
Florida, AMT	8	5
Florida, NCA	2	1
Florida, ASCP, NCA	12	8
Other	16	10

n = 153

missing = 1

All medical technologists responding indicated they held Florida licensure, required for laboratory practice in the state of Florida. The "other" category included physicians, a personnel director, a hospital administrator and other combinations of Florida licensure and national certification.

Hospital Laboratory Accreditation

Hospital accreditation types included Florida State, JCAH, CAP and AABB. All respondents indicated single or combinations of accreditation. Table 5 is a summary of hospital laboratory accreditation held by responding hospitals.

Hospital/Laboratory Accreditation

	All Hospitals		Rural	Urban	Large	Small
Accreditation	No.	Percent	Percent	Percent	Percent	Percent
JCAH	3	2	4	1	-	4
Florida State	8	5	11	3	-	10
Fla, CAP, AABB	3	2	2	2	1	3
Fla, JCAH, AABB	10	6	7	6	8	5
Florida, JCAH	56	36	50	31	22	50
Fla, JCAH, CAP	37	24	11	30	36	13
Fla, JCAH, CAP, AABB	22	14	9	17	20	9
Fla, CAP	12	8	4	9	11	5
Other	3	2	2	2	3	1
	n = 154		n = 46	n = 108	n = 76	n = 78

From Table 5 it can be seen that a large percentage of small, rural hospitals have single accreditation or a combination of Florida and JCAH accreditation. A greater percentage of large and urban hospitals have CAP or AABB accreditation in addition to Florida and JCAH accreditation.

Numbers of Personnel

Table 6 contains a summary of the mean numbers of employees in various positions within a laboratory.

TABLE 6

Mean Numbers of Personnel

Personnel Type	Rural	Urban	Small	Large
Technologist	10.3	25.9	8.8	34.4
Technician	4.6	8.3	2.9	11.2
Phlebotomist	3.4	8.2	2.5	13.2
Support	2.7	8.2	2.1	9.7
Other	2.3	9.9	1.9	11.6
	n = 46	n = 108		

The largest number of technologists reported for a small hospital was 34 while the largest number for a large hospital was 99. There was also a difference in the largest number (45) of technicians in large hospitals and small hospitals (16 technicians). The results of rural and urban hospitals are not as valid because one hospital that serves a rural population is classified as large and employs 99 technologists. These results also indicate that large and urban hospitals use more support personnel such as phlebotomists, clerks, glassware washers and others than do rural and small hospitals.

Staffing Pattern

Staffing patterns of most hospitals are of four basic types: (a) 24 hour coverage, (b) days, with emergency call at nights and on weekends, (c) weekdays only, and (d) seven days with emergency call during nighttime hours. Table 7 contains a summary of the staffing patterns of the responding hospitals.

TABLE 7

Hospital Staffing Patterns

	All Hospitals	Rural	Urban	Small	Large
Pattern	Percent	Percent	Percent	Percent	Percent
24 hours	73	46	85	47	100
Days: call, night & week-ends	7	13	5	14	-
Weekdays	7	11	5	13	-
7 days, night call	7	17	3	14	-
Other	7	13	3	12	-

These results indicate that more urban and large hospitals provide 24-hour coverage in their laboratories than do rural and small.

Staff Openings

Respondents for 65 hospitals indicated they had openings in one or more positions, those in 60 indicated no openings and 29 respondents did not answer the question. Table 8 contains a summary of the numbers by types and openings in hospitals at the time of the survey.

TABLE 8

Numbers of Positions Open in Hospitals Indicating Openings

Personnel Type	Total Openings	Small		Large		Rural		Urban	
		No.	Mean	No.	Mean	No.	Mean	No.	Mean
Technologists	89	28	1.4	63	1.7	29	1.9	60	1.4
Technicians	20	6	0.3	14	0.4	5	0.3	15	0.3
Phlebotomists	23	1	0.1	22	0.6	3	0.2	10	0.2
Support	12	3	0.2	9	0.2	4	0.3	8	0.2
Other	4	0	0	4	0.1	3	0.2	1	0.0

All rural hospitals indicated at least one technologist opening. Five urban hospitals indicated no openings. One of each small and large hospital indicated no openings for either technologists or technicians. Mean openings for all hospitals in the technologist and technician categories were similar. Respondents for rural hospitals indicated a slightly higher number of openings for the technologist category than did those for other types of hospitals.

Credentials Specified or Accepted

Respondents were asked to indicate (a) if they specified credentials, (b) which credentials are specified for employment, and (c) which credentials are accepted if none are specified. Of the 154 hospital respondents, 129 indicated credentials are specified, five indicated that credentials are not specified and 20 failed to answer the question. Three respondents indicated they specify credentials but failed to complete the second part of the question. Two respondents listed credentials that are accepted but failed to answer the first part of the question. Both of these respondents used general terms such as education, certification and licensure and were classified as "other."

Credentials specified or accepted included combinations of licensure, national certification and education. In Table 9 and succeeding tables, BSMT refers to a Bachelor of Science in medical technology, BSLA refers to a bachelor's degree in liberal arts, BSCh refers to a Bachelor of Science in chemistry and BSBS refers to a Bachelor of Science in biological science. Table 9 and Table 10 contain a summary of the types of credentials specified or accepted by responding hospitals.

More than half of the respondents indicated they require Florida licensure or a combination of Florida licensure and ASCP certification. Those first two categories were evenly distributed among all hospitals.

TABLE 9

Credentials Specified or Accepted

	All Hospitals	Large	Small	Rural	Urban
Credential	Percent	Percent	Percent	Percent	Percent
Florida licensure	38	32	42	44	36
Fla, ASCP	28	28	27	23	30
Fla, ASCP, NCA, AMT	3	3	3	2.5	3
Fla, BS	8	9	8	13	6
Fla, ASCP, AMT	4	1	6	5	3
BS or BSMT	3	5	2	0	4
ASCP, BS	0	1	0	0	1
Other	11	15	9	10	12
ASCP only	5	6	3	2.5	5
	n = 133	n = 68	n = 66	n = 39	n = 95

TABLE 10

Categories of "Other" Credentials

Credential	Number
Licensure, certification	4
Licensure, certifidation, education	2
Florida, license, education	3
ASCP, AMT, NCA	1
Education, experience	1
Education	1
DHEW[a], ASCP	1
All Credentials	1 n = 15

[a]DHEW refers to the proficiency examination given by the Dept. HHS in the 1970s.

Section Two: Analysis of Results

This section is concerned with analysis of data regarding the hypotheses stated in Chapter I (See page 15 above). For hypotheses tested with the chi-square test of significance, certain categories of data were combined in order to reduce the number of cells with expected frequencies less than five. In case the degree of freedom (df) is greater than one, less than 25% of the cells should have expected frequencies less than five (Siegel, 1956). These categories included: (a) licensure/certification of respondent, (b) type of laboratory accreditation, and (c) importance of criteria. Laboratory accreditation type was reclassified into two categories: (a) CAP approved and (b) non-CAP approved. Licensure/certification of respondent was reclassified into three categories: (a) Florida

licensure only, (b) Florida licensure and ASCP certification, and (c) all other categories. The importance scale for specific criteria was reclassified as (a) important, and (b) not important. In this case (a) included "very" and "moderately important" while (b) included "slightly important" and "not considered:". The SPSS program CROSSTABS (Nie, et al., 1975) was used to calculate chi-square two-sample analyses (independent samples). Some respondents did not complete all or part of one or more questions. The investigator used the SPSS option to eliminate missing data from all statistical computations.

Hypothesis 1: Employers do not select employees according to their own credentials. Licensure/certification of respondent was compared with credentials specified or accepted and with importance of selected criteria in question nine (Appendix C). Means for the importance of criteria were calculated and are summarized in Table 18, found in Appendix D.

TABLE 11

Licensure/Certification of Respondent and Criterion Importance

Credential	χ^2	p	n
ASCP	12.77	.0017*	152
NCA	12.41	.0020*	146
AMT	7.07	.0292*	152
Fla. license	1.06	.5883	152
BSMT	4.56	.1020	150
BSLA	1.09	.5793	141
BSBS	1.11	.5747	145
BSCh	0.26	.8788	144
Associate of Arts	2.02	.3630	143
On-the-job trainee	3.74	.1541	145
Experience	0.66	.7186	146
Grade point average	1.91	.3842	144
References	1.06	.5887	151
Interview	2.89	.2356	151

df = 2

*p = < .05

A 3 X 4 chi-square analysis was performed to investigate the relationship of licensure/certification of respondent with credentials specified or accepted. The chi-square analysis indicated a significant relationship, χ^2 (6) = 25.09, p = < .05.

A 3 X 4 chi-square analysis was performed to investigate the relationship of licensure/certification of respondent with importance

assigned to criteria used for employment (Table 11). The chi-square for national credentials (ASCP, NCA, AMT) indicated a significant relationship, $p = < .05$. Chi-square analysis results for the other criteria were not significant, $p = > .05$.

These findings led the investigator to reject Hypothesis 1. Certification/licensure of the respondent made a difference in the credentials specified or accepted and in the importance of criteria concerning certification of employees selected.

Hypothesis 2: Selection standards for large hospitals do not differ from those of small hospitals. Size of hospital (large versus small) was compared with credentials specified or accepted and with ranks assigned to selection standards (Question 10, Appendix C). Means of rankings assigned to selection standards were calculated and are summarized in Table 19, found in Appendix E.

A 2 X 4 chi-square test of significance performed to investigate the relationship of hospital size to credentials specified or accepted indicated no significant relationship, χ^2 (3) = 4.57, $p = > .05$.

A Mann-Whitney U test was performed to examine the relationship of hospital size to ranks given to selection standards (Table 12). The results of the Mann-Whitney test for all standards except BSBS and BSCh were not significant, $p = > .05$. The results of the Mann-Whitney test for the Bachelor of Science in biological science and the BAchelor of Science in chemistry indicated a significant relationship $p = < .05$.

The investigator is led to accept Hypothesis 2. Hospital size makes no difference in credentials specified or in ranks given to selection standards.

TABLE 12

Hospital Size and Ranks of Selection Standards

Selection Standard	Mean Rank	z	p
ASCP	8.048	-0.2657	.7905
NCA	4.512	-0.8326	.4051
AMT	4.440	-1.7371	.0824
Fla license	9.155	-0.0374	.9702
BSMT	7.964	-1.5772	.1147
BSBS	4.786	-2.0444	.0409*
BSCh	4.321	-2.5393	.0111*
Associate of Arts	3.155	-1.8344	.0666
On-the-job trainee	2.214	-1.3875	.1653
Experience	6.440	-1.0751	.2823

α = 84

*p = < .05

Hypothesis 3: Selection standards for rural hospitals do not differ from those of urban hospitals. Hospital location (rural and urban) was compared with credentials specified or accepted and with ranks assigned to selection standards.

A 2 X 4 chi-square test of significance performed to investigate the relationship of hospital location with credentials specified or accepted showed no significant relationship, χ^2 (3) = 3.36, p = > .05.

A Mann-Whitney U test performed to examine the relationship of hospital location with ranks given to selection standards (Table 13) showed no significant relationship for all rankings, p = > .05.

TABLE 13

Hospital Location and Ranks of Selection Standards

Selection Standard	Mean Rank	z	p
ASCP	8.048	-1.3191	.1871
NCA	4.512	-0.5959	.5513
AMT	4.440	-0.3826	.7020
Fla license	9.155	-1.2126	.2253
BSMT	7.964	-0.4624	.6438
BSBS	4.786	-0.8784	.3797
BSCh	4.321	-1.5570	.1195
Associate of Arts	3.155	-0.7621	.4460
On-the-job trainee	2.214	-0.4023	.6874
Experience	6.440	-0.2914	.7707

n = 84

α = .05

The investigator is led to accept Hypothesis 3. Hospital location makes no difference in credentials specified or accepted and in ranks assigned to selection standards.

Hypothesis 4: Employers in laboratories with CAP approval do not prefer personnel with ASCP credentials over personnel without ASCP credentials. Laboratory accreditation type (CAP and non-CAP) was compared with credentials specified or accepted and with the importance given to selected criteria.

A 2 X 4 chi-square test of significane performed to investigate the relationship of laboratory accreditation type with credentials specified or accepted for employment showed no significant relationship, χ^2 (3) = 4.03, $p > .05$.

A 2 X 2 chi-square test of significance performed to investigate the relationship of laboratory accreditation type on the importance given to selected criteria (Table 14) showed no significant relationship, $p = > .05$.

The investigator is led to accept Hypothesis 4. Hospital laboratory accreditation type makes no difference in the credentials accepted for employment.

TABLE 14

Laboratory Accreditation Type and Criterion Importance

Selection Criterion	χ^2	p	
ASCP	3.19	.0741	n = 153
NCA	2.00	.1572	n = 146
AMT	0.07	.7942	n = 153
Fla license	0.00	.9948	n = 153
BSMT	1.51	.2188	n = 151
BSLA	0.01	.9284	n = 142
BSBS	0.09	.7592	n = 146
BSCh	0.95	.3308	n = 144
Associate of Arts	2.22	.1366	n = 143
On-the-job trainee	0.23	.6329	n = 145
Experience	0.89	.3465	n = 146
Grade point average	0.08	.7779	n = 152
References	0.33	.5671	n = 152
Interview	0.00	.9895	n = 152

df = 1

$\alpha = .05$

Hypothesis 5: Employers make no distinction between state and national credentials in selecting employees. The importance given to Florida licensure was compared with the importance given to national credentials.

A 2 X 2 chi-square test of significance performed to determine the relationship of the importance given to Florida licensure to the importance given to national credentials (Table 15) showed no significant relationship, $p = > .05$.

TABLE 15

Importance of Florida Licensure and National Credentials

Credential	χ^2	p	
ASCP	0.00	1.0000	n = 152
NCA	0.00	1.000	n = 145
AMT	0.00	1.0000	n = 152

df = 1

α = .05

The investigator is led to accept Hypothesis 5. There is no difference in the importance given to Florida licensure and national credentials.

Hypothesis 6: Employers do not use informal criteria as often as written guidelines for employee selection. A single sample chi-square test of significance performed to determine if informal criteria were used as often as written guidelines in selection of personnel (Table 16) indicated a significant result, χ^2 (1) = 54.63, $p = < .05$.

TABLE 16

Use of Written Guidelines and Informal Criteria

	Value	Expected
Written guidelines	117	72.50
Informal criteria	28	72.50
n = 145	$\chi^2 = 54.63$	df = 1
	$p = .0000$	

The investigator is led to reject Hypothesis 6. Written guidelines are used more often than informal criteria in selection of personnel.

Hypothesis 7: Employers do not consider national credentials as important as a college degree in selecting employees. The importance of national credentials (ASCP, AMT, NCA) was compared with the importance of the college degree (BSMT, BSLA, BSBS, BSCh, and Associate of Arts).

A series of 2 X 2 chi-square tests of significance performed to determine the relationship between the importance of national credentials and college degree (Table 17). Except for ASCP certification and the BS in medical technology, the chi-square analysis indicated no significant relationship, $p = > .05$. The chi-square analysis of the importance given to the ASCP credential and the BS in medical technology indicated a significant relationship, $\chi^2 (1) = 5.97$, $p = < .05$.

Importance of National Credential and College Degree

Credential	BSMT	BSLA	BSBS	BSCh	AA
ASCP	$\chi^2 = 5.97$	$\chi^2 = .008$	$\chi^2 = 0.07$	$\chi^2 = 0.89$	$\chi^2 = 0.36$
	$p = .014$*	$p = .7827$	$p = .7876$	$p = .3432$	$p = .5497$
NCA	$\chi^2 = 0.00$	$\chi^2 = 0.04$	$\chi^2 = 0.07$	$\chi^2 = 2.62$	$\chi^2 = 0.34$
	$p = 1.0000$	$p = .8364$	$p = .5962$	$p = .1051$	$p = .5616$
AMT	$\chi^2 = 0.06$	$\chi^2 = 0.26$	$\chi^2 = 0.28$	$\chi^2 = 1.23$	$\chi^2 = 0.00$
	$p = .8074$	$p = .6114$	$p = .3465$	$p = .2688$	$p = 1.0000$

$df = 1$

*$p = < .05$

The investigator is led to accept Hypothesis 7. There is no difference in the importance of national credentials and college degree. In the case of the importance of the ASCP credential and the BS in medical technology, more respondents (127) who rated the ASCP credential as important also rated the BS in medical technology as important.

Section Three: Discussion of Results

Analysis of sample demographic data showed that respondents were equally divided between large and small hospitals. However, 70% of the respondents indicated they served an urban population. In addition, small hospitals were evenly divided between urban and rural. More than 80% of the urban hospitals were large. The results may reflect this primarily urban hospital population.

Hospital/laboratory accreditation varied between large urban and small rural hospitals. Large urban hospitals were more likely to have specific laboratory accreditation, such as CAP or AABB, than small rural hospitals. This reflects the fact that larger hospitals tend to have more specialized laboratory departments than small hospitals.

Small and rural hospitals use less support personnel than large or urban hospitals. One can assume that technologists and technicians still perform some of the functions of support personnel in small hospitals.

In the past, few hospitals had 24-hour coverage. In this sample, respondents for a large percentage of hospitals, including small hospitals, indicated they had staff working throughout a 24-hour period or at least during daytime hours, seven days a week, with call back only at night.

At the time of this study unemployment was high in all areas of the economy and people who held jobs were not likely to resign. This economic climate is reflected in the small numbers of openings reported. However, there were an average of two openings for medical technologists in rural hospitals in contrast to an average of 1.5 openings in large and urban hospitals. Means of other positions were similar in the other categories of openings. Rural hospitals seem to have more staff turnover among medical technologists.

In the 1975 National Personnel Practices Survey (Roach, 1975a; Roach, 1975b) investigators reported that only about half of their respondents had been given job descriptions. Job descriptions contain credential requirements for the position, thus only half of the 1975 respondents had written indication of job credentials.

In the Florida hospitals surveyed in this study, 81% of the respondents indicated they used written guidelines for personnel requirements. This may reflect a much needed increase in systematic definition of position credential requirements.

Among the respondents, all but five were laboratory managers or chief technologists. Of those five, two were physicians and three were hospital administrators. A large majority of the respondents held one or more national credentials in addition to Florida licensure. Only 9% held NCA certification, perhaps reflecting the lack of awareness of this relatively new national credential. The licensure/certification that respondents hold seemed to influence their choices of credentials specified or accepted and the importance assigned to the criteria. Although chi-square analysis is in reality only a test of "goodness of fit," the significance of the results indicated that variations could not be attributed to chance.

A greater percentage of employers specified credentials other than Florida license alone. Only 38% indicated Florida license alone was sufficient for employment. This may indicate that other standards are more important than the license. References and interviews were considered to be moderately or very important in selection of employees (Table 18). Experience was also considered important to the respondents. The lesser importance of the NCA and AMT credential may reflect the fact that they are less well known that ASCP certification. References and interview are considered most important after Florida licensure, but ASCP certification and the BSMT degree were more important than references when selection standards were ranked (Table 19).

In conclusion, there was no difference in the credentials specified or accepted and the importance of those credentials among the categories of hospitals (size based on number of beds, location). Ranks of selection standards among those categories appeared to show no difference. Laboratory approval type also appeared to have no relationship to the importance of credentials specified or credentials accepted. No relationship appeared to exist between the importance of licensure, national credentials and education. A relationship did exist between the respondents' own credentials and the credentials they selected as important.

CHAPTER IV
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This study was designed to collect data about manpower selection criteria used in Florida hospitals for employment of laboratory personnel. The study was intended to show whether manpower selection criteria were different among various hospitals categorized by number of beds and location or respondent characteristics and whether certain criteria were considered more important than others in selection of personnel.

Results of Analysis of Data

Analysis of demograhic data indicated the following characteristics for hospitals and respondents. Questionnaires were sent to 194 hospitals, of which 54% were small, 46% large. Of the 154 responding hospitals, 49% were large, 51% small. Among responding hospitals, 30% were rural, 70% were urban. Small hospitals averaged eight technologists while large averaged 34. Small hospitals had fewer support personnel than large hospitals. The data indicated that a significant number of all hospitals provided 24-hour staffing. All large hospitals were staffed during each 24-hour period.

The economic climate at the time of this study was reflected in the small number of openings for personnel in responding hospitals. Hospitals had an average of one to two positions open at the technologist level and less than one in other categories.

Accreditation by the Joint Commission on Accreditation of Hospitals (JCAH) was reported by 82% of all hospitals and College of American

Pathologists (CAP) accreditation was reported by 50% of all hospitals. CAP accreditation was more common among large urban hospitals than small rural hospitals. More than half of the respondents reported some type of national certification in addition to Florida licensure. Only 27% of respondents held Florida licensure alone. In addition, more than 60% of the respondent hospitals specified or desired credentials such as academic degree or certification in addition to Florida licensure. When importance of credentials was rated, interview, references, a bachelors degree in medical technology and experience rated higher than importance of any national credential. When selection standards were ranked, ASCP certification, a bachelors degree in medical technology, and experience ranked higher than other national certification and degree types. In both cases, Florida licensure was the highest rated or ranked criterion.

Hypothesis 1: Employers do not select employees according to their own credentials. Analysis of the relationship of licensure/certification of respondents with credentials specified or accepted indicated a significant relationship, χ^2 (6) = 25.09, p = < .05. Analysis of the relationship of respondent licensure/certification with importance of criteria indicated a significant result for national credentials, p = < .05. The investigator was led to reject Hypothesis 1. Licensure/certification of respondent made a difference in the credentials specified or accepted and in the importance given to national credentials.

Hypothesis 2: Selection standards for large hospitals do not differ from those of small hospitals. Analysis of the significance of size (number of beds) with credentials specified or accepted showed no significant relationship, p = > .05. Analysis of the relationship of

size with ranks given to selecte standards showed no significant relationship, p = > .05. The investigator was led to accept Hypothesis 2. Selection standards are not different for large and small hospitals.

Hypothesis 3: Selection standards for rural hospitals do not differ from those of urban hospitals. Analysis of the relationship between hospital location and importance given to criteria showed no significant relationship, p = > .05. Analysis of the relationship between hospital location and ranks of selection criteria showed no significant relationship, p = > .05. The investigator was led to accept Hypothesis 3. There is no difference between rural and urban hospitals in importance or ranks of selection criteria.

Hypothesis 4: Employers in laboratories with CAP approval do not prefer personnel with ASCP credentials over personnel without ASCP credentials. Analysis of the relationship of laboratory approval type with importance given to criteria and with credentials specified or accepted showed no significant relationship, p = > .05. The investigator was led to accept Hypothesis 4. Laboratory approval type makes no difference in criteria for applicants selected.

Hypothesis 5: Employers make no distinction between state and national credentials in selecting employees. Analysis of the importance of Florida licensure compared to national credentials showed no significant relationship, p = > .05. The investigator accepts Hypothesis 5. Respondents considered Florida licensure of equal value to national credentials. When all criteria were considered, Florida licensure rated higher than national credentials. However, individually respondents tended to give the same importance to Florida licensure as national credentials.

Hypothesis 6: Employers do not use informal criteria as often as written guidelines for employee selection. A single sample chi-square test of significance was performed to determine if informal criteria were used as often as written guidelines in selection of personnel. The analysis showed a significant result, $p = < .05$. The investigator rejects Hypothesis 6. Written guidelines are used more often than informal criteria in selection of personnel.

Hypothesis 7: Employers do not consider national credentials as important as a college degree in selecting employees. Analysis of the relationship of importance of national credentials with college degree showed no significant difference, $p = > .05$, except for the ASCP credential and the bachelor's degree in medical technology. Respondents who rated ASCP certification as important were more likely to rate the BSMT as important. The investigator accepts Hypothesis 7. National credentials and a college degree are of equal importance as a selection criterion.

Conclusions of the Study

The following major conclusions appear to be valid within the limitations of the study.

1. Hospitals in Florida are more likely to use written guidelines for selection of personnel than informal criteria.
2. Selection standards for small and large hospitals do not differ.
3. Selection standards for rural and urban hospitals do not differ.
4. College of American Pathology (CAP) approved hospital laboratories and non-CAP approved hospital laboratories show no differences in employee selection criteria.
5. Selection criteria accepted or specified are related to the licensure or certification held by personnel responsible for hiring in the laboratory.

6. Individually respondents tended to give the same importance to Florida licensure as to national credentials.
7. Respondents who rated ASCP certification as important were more likely to rate the BSMT as important. Employer ratings of importance of other national certification types were not related to a college degree.
8. Among all respondents, the interview, experience and the BSMT rated higher in importance after Florida licensure than other criteria.
9. Among all respondents, ASCP certification and the BSMT were ranked highest after Florida licensure when selection standards were ranked.
10. On-the-job trainees were rated lowest in importance and ranked lowest among selection standards. Employers appear to prefer more formal training for personnel.

Selection criteria for laboratory personnel appear to be similar among all hospital categories and respondent characteristics in Florida hospitals. One cannot assume that rural, urban, small, and large hospitals are different in their laboratory staffing needs. Nor can one assume that hospital approval type will have an effect on selection criteria.

A majority of respondents indicated they used written guidelines for selection. Informal guidelines are no longer sufficient; a more formal selection process appears to be in effect in most Florida hospitals. Laboratory staffing policies are evidently becoming more objective.

Licensure is required by law in Florida and overall this criterion was ranked and rated highest in importance. Respondents did appear to desire additional credentials including education for employment. A large number of respondents specified the BSMT as a requirement for employment, indicating that formal preparation in a medical laboratory education program was considered a priority. Employers also tended to accept or specify credentials similar to their own. This reflects the investigator's assumption that many employers are not familiar with the variety of credentials available today. Education of employers about the credentialing process would appear to be necessary.

The employment interview was ranked high among criteria for selection. This implies that affective criteria may be important. This fact should be of concern to educators planning or evaluating medical laboratory education programs. The curriculum in these programs should provide a component that teaches employability skills. Educators should provide instruction in the interview and credentialing process. In addition, affective criteria necessary for employment should be identified and affective characteristics developed in students preparing for careers in medical laboratory science.

Suggestions for Further Research

1. Results of this study cannot be generalized to a larger population without collecting data about manpower selection criteria in a non-licensure state and comparing results from the two samples.
2. An attempt should be made to assess credentials held by those currently employed in clinical laboratories. The 1977 Survey of Clinical Laboratories (Lawton, et al., 1977) showed that 65% of all technical personnel held at least one certification or

registration. In this investigation, 73% of the administrative respondents had national certification in addition to Florida licensure. The question of whether all personnel are so credentialed should be answered.

3. A follow-up should be done to determine if current job openings reflect an economic recovery.
4. A majority of the respondents indicated they used written guidelines for selection. Assessment of the contents of these guidelines would further validate this study.
5. The employment interview was ranked high among criteria for selection. This implies that affective criteria may be important. Assessment of these affective criteria will provide information about other characteristics perceived as necessary in laboratory personnel. This would have an implication in educational programs.

Several other questions are raised by the results of this study. First, criteria preferred appear to be related to the employers' own credentials. Are we therefore perpetuating the fragmentation that now exists in clinical laboratory personnel credentialing? Related to this is the fact that national credentials were given the same inportance in licensure. Do employers feel that a national credential is more valid? Does this mean that employers favor a single, national, credential for clinical laboratory personnel?

Second, a majority of the respondents indicated they had written guidelines for employment. Written guidelines may make selection of employees more objective but the content of the guidelines will determine the quality of the personnel hired. What is the specific content

of guidelines used for selection? Are the guidelines in a form that is useful? Having guidelines on file does not necessarily mean that they are in a form that is easily applied to the hiring process.

Last, formal education of some type was given high importance and high priority in the selection of personnel. A majority of the respondents rated the Bachelor of Science in medical technology higher than other types of degrees. This implies that formal education, specific to the profession, is a desirable credential. Do employers prefer this degree because it implies a certain level of skill? Is this fact again reflective of the need for some type of standardization for clinical laboratory personnel credentialing?

Additional research about clinical laboratory hiring practices is needed to determine the answers to these questions. It should be encouraging to those involved in the education of clinical laboratory personnel that employers recognize the bachelor's degree with a major in medical technology as an important criterion for selection of personnel. Less encouraging is the fact that experience was considered important to these employers. This may imply that possession of formal medical technology training does not result in that level of skill which is expected by employers at entry level in clinical laboratories.

APPENDIX A
COVER LETTER

Recent position papers by professionals in medical laboratory science have emphasized the need for quality personnel. These authors feel that little is known about actual hiring practices in the clinical laboratory.

In order to gain information about hiring practices as part of the work toward a doctorate at the University of Florida, I have developed a questionnaire to gather data about laboratory manpower selection criteria in the state of Florida.

I would appreciate your assistance in routing this questionnaire to the person in your clinical laboratory responsible for interviewing and making decisions about applicants for employment in the clinical laboratory (usually the chief or administrative technologist). A stamped, addressed envelope is enclosed for return of the questionnaire. The questionnaire should be returned by December 15, 1982.

Although I am a graduate student in the Division of Curriculum and Instruction at the University of Florida, I am teaching in the Department of Medical Technology at Southeastern Massachusetts University to support myself in this final year of my doctoral studies. Should you have questions about the study or about my credentials, please feel free to contact me at the college or my major advisor at the University of Florida. The telephone numbers and addresses are given below.

If you would like to receive a summary of the data collected, please fill out the appropriate place on the enclosed postcard and return it to me.

I appreciate your help and assistance in routing the questionnaire to the appropriate person. The data will be of use in assessing manpower needs and may have an impact on the status of credentialing of laboratory personnel in Florida.

Sincerely yours,

Major advisor:
Margaret K. Morgan PhD
Director, Center for Allied Health Instructional Personnel
University of Florida
Gainesville, FL 32611
(904) 392-2391

Anne T. Rodgers MT (ASCP)
(617) 999-8584
(617) 997-5141

APPENDIX B
FOLLOW-UP LETTER

We are completing the data collection phase of the study on Florida manpower selection criteria in clinical laboratories and have not yet received a response from your institution. The questionnaire you received in December was to be routed to the administrative or chief technologist in your clinical laboratory.

The information received so far shows some interesting trends and we are anxious to include your data. In addition, the data summary may support manpower decisions made by your institution. Perhaps you overlooked the questionnaire or it went astray during the routing process. We need your data to make this a complete study. Won't you help us now?

I am enclosing another copy of the questionnaire and a stamped, addressed return envelope. I would appreciate your routing it to the appropriate person in the clinical laboratory for completion as soon as possible.

If you would like a summary of the data, please send your name and address to me at the address below or include it with the questionnaire.

Should you have questions about the study, please feel free to contact me or my major advisor, Dr. Margaret Morgan.

Sincerely yours,

Anne T. Rodgers MT (ASCP)
(617) 999-8584 (Bus.)
(617) 997-5141 (Home)
765 Tucker Road. #1
No. Dartmouth, Mass. 02747

Major advisor:
Margaret K. Morgan, PhD.
Director, Center for Allied
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APPENDIX C
MANPOWER SELECTION CRITERIA QUESTIONNAIRE

1. Title of person completing questionnaire _____

2. Type of licensure or certification held by person completing questionnaire _____

3. Hospital location: In terms of the population served is your hospital _____Rural? _____Urban?

4. Clinical laboratory accreditation or approval: Please check
_____JCAH _____State of Florida _____CAP
Other (please specify) _____

5. Number of employees in laboratory
_____Technologist _____Support (aides, etc.)
_____Technician _____Other (please specify)
_____Phlebotomist

6. Does your laboratory have budgeted positions that are not filled?
If yes, please indicate how many in each category:
_____Technologist _____Phlebotomist
_____Technician _____Support

7. How is your laboratory staffed?
(please check items that apply)
_____24-hour
_____Days, with emergency call-back on nights and weekends
_____Weekdays only
_____Weekdays, weekend days with emergency call-back at other times
_____Other (please specify)

8. Do you have written guidelines for employing persons?
_____Yes _____No
If yes, do you specify credentials? _____Yes _____No
If yes, please specify credentials _____
If no, what credentials do you accept? _____

MANPOWER SELECTION CRITERIA QUESTIONNAIRE

9. In terms of practice in the field, please indicate the importance of each item listed as a criterion in employment of an individual.

	very important	moderately important	slightly important	not considered
Technologist Level (Certification) ASCP	_____	_____	_____	_____
NCA (CLS)	_____	_____	_____	_____
AMT (American Medical Technologists)	_____	_____	_____	_____
Florida license	_____	_____	_____	_____
Other (please specify)	_____	_____	_____	_____
(Education)	_____	_____	_____	_____
Bachelor of Science in medical technology	_____	_____	_____	_____
Bachelor of Science in liberal arts	_____	_____	_____	_____
Bachelor of Science in biological science	_____	_____	_____	_____
Bachelor of Science in chemistry	_____	_____	_____	_____
Associate of Arts	_____	_____	_____	_____
On-the-job trainee	_____	_____	_____	_____
Experience	_____	_____	_____	_____
(Other)	_____	_____	_____	_____
Grade point average	_____	_____	_____	_____
Interview	_____	_____	_____	_____
Other (please specify)	_____	_____	_____	_____

MANPOWER SELECTION CRITERIA QUESTIONNAIRE

10. In terms of practice in the field, please assign the following criteria in order of priority in employment of an individual as an entry level technologist. (1 through 10)

_____ASCP Certification	_____BS in biological science
_____NCA Certification	_____BS in chemistry
_____AMT Certification	_____Associate of Arts (AA)
_____Florida license	_____On-the-job training
_____BS in medical technology	_____Experience
_____BS in liberal arts	_____Grade point average

Please note below any employment criteria not listed above which you consider essential to the process:

Responses will be held in confidence. If you would like to have a summary of the data, please write your name and address on a separate sheet of paper and enclose it with the questionnaire in the envelope provided. THANK YOU FOR YOUR HELP.

Please return this questionnaire to
Anne T. Rodgers MT (ASCP)
765 Tucker Road, Apt. 1
North Dartmouth, MA 02747

APPENDIX D

TABLE 18

Mean of Importance Assigned to Criteria

Criterion	Small	Large	Rural	Urban
ASCP	3.17	3.41	3.16	3.34
NCA	2.06	2.37	1.98	2.32
AMT	2.37	2.17	2.18	2.32
Fla license	3.95	3.96	3.98	3.94
BSMT	3.32	3.72	3.39	3.57
BSLA	1.70	2.02	1.46	2.01
BSBS	2.42	2.86	2.32	2.77
BSCh	2.39	2.76	2.31	2.69
Associate of Arts	1.96	2.29	2.00	2.19
OJT*	1.70	1.72	1.73	1.72
Experience	3.58	3.56	3.55	3.59
Grade point average	2.19	1.96	2.30	1.98
References	3.61	3.39	3.67	3.43
Interview	3.90	3.81	3.83	3.87

*OJT = On-the-job trainee

4 = very important

3 = moderately important

2 = slightly important

1 = not considered

APPENDIX E

TABLE 19

Mean of Ranks for Selection Standard

Standard	Small	Large	Rural	Urban
ASCP	8.15	8.26	8.00	8.30
NCA	4.75	4.46	4.36	4.70
AMT	5.11	4.02	4.77	4.47
Fla license	9.32	9.12	9.57	9.05
BSMT	7.92	8.19	8.12	8.04
BSBS	4.44	5.33	4.66	5.03
BSCh	4.00	4.80	3.97	4.63
Associate of Arts	2.81	3.44	3.57	2.95
On-the-job trainee	2.77	2.22	2.28	2.57
Experience	6.98	6.26	6.91	6.49

High rank = 10

Low rank = 1

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BIOGRAPHICAL SKETCH

Anne Townsley Rodgers was born in Worcester, Massachusetts, and educated in the Winchester, Indiana, public schools. She was graduated from Northfield-Mount Herman School in East Northfield, Massachusetts, and received a Bachelor of Arts degree in bacteriology from Ohio Wesleyan University, Delaware, Ohio. Her medical technology clinical internship was completed at the Washington Hospital Center in Washington, D.C. She subsequently became certified as a medical technologist by the Board of Registry of the American Society of Clinical Pathologists. After four years of laboratory practice, she began work on a Master of Arts in Teaching degree at the University of Massachusetts in Amherst and was awarded the MAT in 1971. Her major was public health and education. Prior to beginning doctoral studies at the University of Florida, she was educational coordinator of the Burbank Hospital School of Medical Technology in Fitchburg, Massachusetts. Presently, Ms. Rodgers is assistant professor of medical technology at Southeastern Massachusetts University in North Dartmouth, Massachusetts.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Margaret K. Morgan, Chairman
Professor of Instructional Leadership and Support

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

James W. Hensel
Professor of Instructional Leadership and Support

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Herman Baer
Professor of Pathology

This dissertation was submitted to the Graduate Faculty of the Division of Curriculum and Instruction in the College of Education and to the Graduate Council, and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

April, 1984

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